**Topic 1 - UNIVERSITY STUDIES**

**Part 1 – The higher education today**

1. **Levels of higher education and length of study in Belarus, the UK and the US**

A three levels system of tertiary education acts in Belarus. First degree lasts 4 years and provides with Specialist Diploma. Second degree provides with Masters Diploma and lasts 1 to 2 years. And the third one provides with Researchers Diploma and lasts 3 years. Degree programmes in the US take about one year longer than prog, in the UK . So, in the UK Bachelors degree requires 3 years of training whereas in the US its 4 years. Masters degree are 1 and 2 years respectively and Doctoral degree are 3 and from 5

to 7 years.

1. **university organisations in Belarus, the UK and the US**

All HEls in Belarus are made up of faculties according to the specialities they provide. Whereas Many universities in the UK are made up of colleges that are dedicated to a specific subject. American univ. have different schools or departments, which house a number of relate majors.

1. **course of study in Belarus, the UK and the US**

An academic year in Belarus is divided into two terms starting on the first Sep, with shorter winter and longer summer holiday. In the US training begin in mid to late Aug, and last for two semesters as well with a rather lengthy break beginning in mid Dec. Whereas the academic year in Britain univ, consists of trimesters, which usually run from the beginning of Oct, to the end of June or the beginning of July.

1. **assignments and grades in Belarus, the UK and the US**

Courses on the US univ. require weekly or biweekly reading as well as other assigments such as major research papers. On the contrary, in the UK, most univ, are much more lecture based. In Belarusian system of high educ, embraces the features of British and American systems.

1. **cost of study in Belarus, the UK and the US.**

In England univ. cost of educ. may charge up to 9000 pounds per year, In the US public out of state institutions are much more affordable than private in-state cnes that can cost up to 50 000 dollars per year. In Belarus higher educ. provide by public and private HEis. In public students with high grades in CT are admitted a cost free basis and granted a scholarship . In private HEls all students pay tuition fees.

**Part 2 – My University**

1. **the mission of BSUIR and core areas of training**

The mission of BSUIR is to train engineers and scientists capable of generating and implementing innovative ideas, creating competitive high-tech products in the spheres of computer science and electronics.

***Core areas*** : Computer Engineering, Software Engineering and Technologies, Cyber Security and Information Security, Electronic Economy and Marketing, Artificial Intelligence, Radio Electronics and Radio Informatics, Infocommunication Technologies, Nanotechnology and Nanoengineering, Big DATA, Internet of Things, Cloud Computing, Medical Electronics, Game Design.

1. **the University framework**

Today the University framework includes 8 faculties, 32 departments, 49 specialities, the Institute of Information Technologies, the Research and Development (R&D) Department. More than 16,000 students including international undergraduate and postgraduate ones coming from different countries of Asia, Africa, the Middle East, Latin America, the European Union, and the CIS receive education in the form of full-time, part-time, or distance learning.

1. **the teaching stuff of BSUIR**

The highly qualified teaching staff consists of academicians, Corresponding members of the Belarusian Academy of Sciences, foreign Academies of Sciences, professors, doctors, associate professors, senior lecturers, and assistants.

1. **subjects being studied and the University curriculum**

Different subjects are taught at the University depending on the faculty and the course. First-year students study physics, higher mathematics, descriptive geometry, technical drawing, and social sciences. Later they acquire profound knowledge in electronics, cybernetics, computing machinery, etc.

Lectures, seminars, laboratory works, and practical classes which attendance is obligatory make up the majority of the *curriculum*. Students are usually assessed at the end of each semester through a pass-fail system, written and oral examinations, and through their coursework projects.

1. **University facilities at the students’ disposal**

The University offers excellent facilities for studying, research and recreation. University facilities at the students’ disposal include a number of computer classes and modern engineering laboratories. A local computer net, including more than 4,000 computers with Wi-Fi access, connects all eight education buildings. A video conferencing centre and lecture theatres are equipped with up-to-date multimedia means. There is a large library with nine reading halls, including three electronic ones with Internet access. Students from other cities

lodge in four dormitories with all modern amenities.

1. **BSUIR as a scientific organization**

BSUIR today is a large scientific organization with 34 R&D labs, 8 scientific centres, and an IT business incubator that cooperate with more than 100 science organisations and educational institutions from more than 40 countries. The University staff and students take part in various international exchange programmes, fulfill scientific research contracts, receive grants and work placements in the world’s top IT companies.

1. **the role of sport and extracurricular activities in the University life**

Sport also occupies a crucial part of University life. The University teams regularly win the leading positions of student sports and compete at

a national level. Students are engaged in different sports activities and there are all the necessary facilities available like a swimming pool, a fitness centre, open playgrounds, a ski depot, and a summer camp at the Braslav Lakes.

*University life* is not only about classes and exams. The Students’ Trade Union and the Student Council offer a plethora of extracurricular activities

for students. The Student Club organises forums, contests, tournaments, festivals, discos, and other social events for recreation.

**Part 3 - Student Life**

1. **personal traits and skills needed for university success**

I can give some advices what you need for university success:

Love what you’re doing, set your goal’s, be punctual, participate in activities, make a to-do list, take care of your health, listen and take down notes.

1. **ways to be a better student**

Good students are: self-motivated, goal-driven, work hard, manage their time well, adaptable, ask questions

1. **your daily routine as a student**

My routine as a student is: wake up, some work, go to the university to the first lecture in schedule, write notes on lecture or working on practice, reading notes after lessons if it needs for work, making labs or some different homework, maybe rest.

1. **the main characteristics of academic life and your workload**

student academic life included : workload, seminars, schedule, lectures, exams, assignments, compulsory classes, dedlines, assessments, student placement.

1. **the main characteristics of student social life and your extracurricular activities**

Student social life include: sports teams, extracurricular opportunities, student council, available activities, university newspaper, faculty ball, group monitor, youth centre, student clubs, assistance.

1. **how to reach the balance between academic and social life at university**.

You shouldn’t choose only two vortices at the aspects a college life.They all interrelated. You can balanced your sleep time, student and social life. You can’t feel the burnout if you will sleep seven hours then nine, and you don’t ruin your relationship with your friends, if you will cut your time for social life some less the student time. Also your academic achievements can help if you find any physical activity, or begin collaboration with your groupmates.

**Topic 2 – Youth and society**

**Part 1 – Youth issues**

1. **the youth problems that American, British, Belarusian teenagers face;**

Youth people in different countries faced same problems at different rates

**American**: Body image, home isolation, lack of affordable housing and unemployment

**British:** Materialism, social isolation, substance abuse and family troubles

**Belarusian:** lack of sleep, parental pressure, loneliness

1. **how to build a path to problem-solving;**

Our path to problem-solving looks like plan:

1. Identify the problem
2. Think about why it is a problem
3. Brainstorm, possible solutions to the problem
4. Evaluate the solution to the problem
5. Put the solution into action
6. Evaluate the outcome of your problem-solving process
7. **how to solve youth problems;**

For solve youth problems they should working with problems following problem-solving path.

1. **role of a family in a teen’s life;**

Family also can help with problems. Your relatives may be the only people who you can trust and speak about your problems.

1. **why the problem shouldn’t be hidden.**

If we will hide our problems they can turn into rampant problem. And the longer we don’t try to solve the problem then harder will solve it in future.

**Part 2. Tech Addiction:**

1. **types of tech and Internet addiction**

Types of **tech addiction**: TV addiction, screen addiction, excessive phone using, video gaming, taking photos

Types of **internet addiction**: online gambling, online shopping, cyber relationship, social media addiction.

1. **problems that can be caused by tech and Internet addictions**

Different mental health professionals revealed a plethora of negative effects at tech and internet addictions: slowing down of psychological development at adolescents,

It can be cause depression, anxiety and loneliness. Multitasking in using technologies can provide poor cognitive functions and poor mental health. Also excessive using technologies a decrease our ability to focus on something and attention spans still short.

1. **reasons for becoming tech and Internet addicted**

Exist some reasons for people to still addicted at technologies and internet and don’t pay attention on it:

1. It’s just very comfortable to start limit themselves or start denying conveniences
2. Sales experts have developed several techniques for people to sell them more technologies and make them spend more of their time in them its randomised rewards, what hooked people attention, endless sources of information and maintain primal fear of isolation.
3. Most of people just don’t notice how much time they spend witch their devices and using internet, so they just don’t know what they addicted.
4. **positive and negative sides of the Internet and technology**

How positive sides I can admit what you always can search information you need, you shouldn’t remember more information in head forever, you can work or have fun at any place you stay, you always connected with your relatives and friends, technologies are gave to us many comfort in our everyday routine, how bad side I think it’s your mental and physical habit what you can cost if you will overuse it.

1. **how to avoid tech and Internet addiction**

To avoid tech and internet addictions you can:

Reduce the number of devices, keep track yourself, restrain yourself, turn off notifications on devices, try a digital detox sometimes.

**Part 3. Generation Gap**

1. **types of generations and their characteristics**

Exist 5 main types of generations on present time:

1. Traditionalists

They are conservative, hierarchical, and have a clear chain of command and top-down management

1. Baby boomers

They have flat hierarchies, democratic cultures, human values, equal opportunities, and a warm and friendly environment

1. Generation X

They are positive, fun, efficient, fast-paced, flexible, informal, and have access to leadership and information

1. Millennials

They are collaborative, achievement-oriented, highly creative, diverse, flexible, and continuously providing feedback

1. Generation Z

They wants independence, can multi-task, wants to communicate face-to-face and is truly digital-native

1. **how we can prevent the generation gap**

To prevent generational gap on workplace we can create environment where knowledge is openly shared and easily accessed instead of being guarded. To do this, employees must be genuinely interested in helping each other to learn and grow.

1. **what each generation can bring to the workplace**

People on workplace always give ideas about better command working or automation work process. I think with compare management elder generations and fresh ideas young generations they can come to progress on workplace.

**4) what barriers can affect communication**

I think barriers in communication appears because different generations used different types op communication and if some of generations can adjust for this options, some people on workplace just don’t know how work with them.

**5) how we can manage different generations at the workplace**

To manage generations on workplace we can follow some advices:

Provide a variety of communication channels; establish a two-way mentorship programme; put respect front and centre; don’t make assumptions; guard againt age segregation

**TOPIC 3.** **CAREER PATH**

**Part 1. Being a Successful Specialist**

1. **Factors of career success**

How factors of career success I can admit:

Hard working, self-improvement, get on with people, having some necessary hard and soft skills, be team-focused and adaptable.

1. **hard and soft skills of any successful specialist**

I think successful specialist should compare soft and hard skills and most useful on my mind are:

Management skills, team-oriented, project-management skills, critical thinking, flexibility, conflict resolution, hard skills depended on kind of job.

1. **qualities of successful leaders**

Good leader should have developed leadership qualities:

He should be some humble, self-aware, empathy and adaptable. Collaborative, people-focused and passionate to promote team work. He should be able to decisive.

1. **Typical functions of different departments in the organisation**

Usually organisations have the structure of departments in which everyone performs their duties:

1)**Administration**

Organisation, planning, direction, coordination, control and evaluation of other departments activities.

2)**Human reesources**

Formalising the contracts, managing social insurance and vacation permits.

3)**Finance**

Acquiring funds for the firm, managing company’s cash flow, managing taxes.

4)**Information technology**

Developing, managing and maintaining an organisation’s technology-related assets, policies, procedures and systems.

5)**Production and quality assurance**

Preventing mistakes and defects in manufactured products and avoiding problems when delivering products or services to customers.

6)**Supply chain management**

Managing operations that are involved in the procurement of raw materials, their processing into finished goods, and distribution to the end consumer.

7)**Marketing**

Promoting the business and mission of an organisation, monitoring and managing social media.

8)**Customer service**

Creating a trustworthy atmosphere and providing the client with the exact information they need right at the time when they want it.

1. **Principles of business ethics and business communication.**

**Business ethics** means the set of rules or principles that the organization should follow.

Business ethic have some basic principles: leadership, Integrity, respect for others, honesty, responsibility, compassion, loyalty.

**Business communication** is exchanging information and ideas within an organization.

Principles: using different communicational tools, encouraging two-way communication, specific and descriptive feedback.

**Part 2. My Speciality**

1. **Variety of jobs in the sphere of information technology**

IT sphere share on main jobs:

1. Mobile application developers
2. Database administrator
3. Web developers
4. IT helpdesk technicians
5. Network specialist
6. Video game developer
7. Graphic designer
8. IT security specialists
9. Software engineers

10) System analyst

11) Computer programmer

12) Hardware engineers

1. **Personal qualities of any IT specialist**

Any IT specialist should have some key skills: analytical, decition-making, project management, leadership, communication.

1. **Typical responsibilities and skills for different IT department jobs**

* Mobile application developers – create software for mobile devices.
* Database administrator – organize and manage a company’s data.
* Web developers - create web pages and web-based applications.
* IT helpdesk technicians – provide technical support and troubleshooting services to end-users, who need help with hardware or software.
* Network specialist - analyse, troubleshooting and evaluate computer network problems.
* Video game developer – use creativity and technical skills to create cutting-edge games.
* Graphic designer – use creativity and technology to create visually engaging graphics that communicate a message.
* IT security specialists – defend an organisations information systems.
* Software engineers – develop computer systems and applications.
* System analyst – manage IT solutions to drive business goals.
* Computer programmer – write the code that fuels computer operation.
* Hardware engineers – design and build computer systems.

1. **Future skills for IT specialists and their importance.**

Future skills important for IT specialist to stay competitive in career all time.

And important skills are: emotional intelligence, adaptability, working with and managing remote teams, data science expertise.

**Part 3. Professional Development**

1. **Personal vs professional vs continuous professional development (CPD)**

Professional development is focused on the workplace. It's the development of skills in relation to your job to help you keep more effective in the workplace. Personal development is more focused on communications, time management, and things such as leadership training. Continuing Professional Development (CPD) is the term that is used to describe the learning activities professionals are engaged into to develop and enhance their abilities.

1. **Elements of CPD**

Most important elements of CPD is: education, motivation, practice, training, grow and work. Because this elements more useful for enhance abilities on my mind.

**3)Motivation as a key factor for professional development**

Motivation is a key factor contributing to people’s professional development. Hierarchy of needs suggests that people are motivated to fulfill basic needs before moving on to other, more advanced needs and motivation is occur to achieve certain needs.

**4)Training and its forms**

Training is teaching, or developing in oneself or others, any skills and knowledge that relate to specific useful competencies. Training has specific goals of improving one’s capability, capacity, productivity, and performance. In business, training is the investment of resources in the employees of a company, so they are better equipped to perform their job. The types of resources invested may include time and money to develop, implement, and evaluate training programmes.

**5)The benefits of CPD**

CPD helps to ensure you have the knowledge and skills necessary to succeed as

a professional. It helps you to build professional confidence and, in turn, the reputation of the profession; adapt positively to change by continuously updating skills support any career goals by focusing on relevant training and development; be more productive and efficient by reflecting on your learning and highlighting gaps in your knowledge and experience and planning action accordingly.

TOPIC 4 ICT CONCEPTS

1. **Computers in our life**

Information and communication technology (ICT) has an important role in our world. It has a great impact on our daily lives. We can get connected with our relatives any time and we can faster get a different types of information. ICT do work with information easer and it allow to change our economy and open different approaches to business management.

The terms “data” and “information” are often used how same, but it incorrect.

**Data** – unorganized pack of facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized.

We can start named data how information when data is processed, organized, structured or presented in given context, so as to make it useful, it is called **information**.

Core characteristics of modern computer:

Speed – it can perform any calculation in seconds.

Accuracy – it is ability of computer performing 100% accurate calculations.

Diligence – computer can work for hours without making any mistakes.

Reliability – a computer is a dependable machine that is capable of performing all tasks and operations at high speeds and with near-perfect accurancy.

Memory – it is used to store data and directions.

Logical – it characteristic of computer such as the capability of thinking, reasoning and learning how people to upgrade quality and speed of calculations.

Versatility – ability or adaptation to quickly switch from one task to another.

Automation – is the use of technology to complete a task with as little human interaction as possible.

Consistency – set of rules already assigned.

Remembrance power – ability of computer remember and recall any data or information when it need.

**Digital revolution** - the shift from mechanical and analogue electronic technology to digital electronics as a means of storing, transferring and utilising information.

1. **Hardware**

Types of computer systems:

**Mainframe** is the most powerful type of computer. It can process and store large amounts of data. It supports multiple users at the same time and can support more simultaneous processes than a PC. The central system is a large server connected to hundreds of terminals over a network. Mainframes are used for large-scale computing purposes in banks, big companies and universities.

**Desktop PC** has its own processing unit (or CPU), monitor and keyboard. It is used as a personal computer in the home or as a workstation for group work.

**Laptop** is a lightweight computer that you can transport easily. It can work as fast as a desktop PC, with similar processors, memory capacity, and disk drives, but it is portable and has a smaller screen.

**Personal digital assistant or** PDA is a tiny computer which can be held in one hand. The term PDA refers to a wide variety of hand-held devices, palmtops and pocket PCs.

**Wearable computer** runs on batteries and is worn on the user's

body. It is designed for mobile or hands-free operation. Some devices are equipped with a wireless modem, a small keyboard and a screen; others are voice-activated and can access email or voicemail.

Basic components of computer.

A typical computer consists of two parts: hardware and software.

Hardware is any electronic or mechanical part of the computer system that you can see or touch.

Software is a set of instructions, called a program, which tells a computer what to do.

There are three basic hardware sections.

1) The **CPU** is the heart of the computer, a microprocessor chip which processes data and coordinates the activities of all the other units.

2) The **main memory** holds the instructions and data which are being processed by the CPU. It has two main sections: **RAM** and **ROM**.

3) **Peripherals** are the physical units attached to the computer. They include: **Input devices**, which let us enter data and commands.

**Output devices**, which let us extract the results.

**Storage devices,** which are used to store information

permanently.

Basic input devices:

**Keyboard** with different various of keys (**alphanumeric**(letters and numbers), **numeric**(keys of numbers at right side of keyboard often named \*numpad\*), **function keys** (F1-F12), **cursor keys** (arrows), **dedicated keys**(shift, ctrl, alt, backspace, enter)

**Mouse** is a hand-held device that lets you move a pointer and select items on the screen. It has one or more buttons to communicate with the PC. A scroll wheel lets you move through your documents or web pages.

**Voice input** - you can control your PC with voice commands; this means you can launch programs, open, save or print files. Some systems let you search the Web or chat using your voice instead of the keyboard.

Output devices:

**Printer** – is a device that prints your text or graphics on paper.

The screen of a computer is often known as the **monitor**, or VDU (visual display unit). Inside the computer, there is a video card which processes images and sends signals to the monitor.

Processing devices:

The **processor**, also called the **CPU** or **central processing unit**, is the brain of your computer. In PCs, it is built into a single chip - a small piece of silicon with a complex electrical circuit, called an integrated circuit - that executes instructions and coordinates the activities of all the other units.

**RAM** (random access memory) is temporary or volatile, that is, it holds data

while your PC is working on it, but loses this data when the power is switched off.

**ROM** (read only memory) is permanent and contains instructions needed by the CPU; the BIOS (basic input/output system) uses ROM to control

communication with peripherals.

Types of storage:

**Magnetic storage**:

Magnetic devices store data magnetically. A disk drive spins the disk at high speed and reads its data or writes new data onto it.

**Optical storage**:

Optical drives use a laser to read and write data, so they are not affected by magnetic fields; but they are slower than hard drives. Modern DVD recorders accept all CD and DVD formats.

**Removable flash memory:**

Flash memory is solid-state, rewritable memory; it is non-volatile, so it

retains data when the power is turned off. This explains its popularity in

small devices.

1. **Issue of e-waste**

E-waste, electronic waste, e-scrap and end-of-life electronics are terms often used to describe used electronics that are nearing the end of their useful life, and are discarded, donated or given to a recycler. The UN defines e-waste as any discarded products with a battery or plug, and features toxic and hazardous substances such as mercury, that can pose severe risk to human and environmental health.

**Why it is problem?**

E-waste can be toxic, is not biodegradable and accumulates in the environment, in the soil, air, water and living things. For example, open-air burning and acid baths being used to recover valuable materials from electronic components release toxic materials leaching into the environment. These practices can also expose workers to high levels of contaminants such as lead, mercury, beryllium, thallium, cadmium and arsenic, and also brominated flame retardants (BFRs) and polychlorinated biphenyls, which can lead to irreversible health effects, including cancers, miscarriages, neurological damage and diminished IQs.

**What we should do, to solve the problem?**

We should recycle or treat ICT equipment (e.g. plastics from mobiles could be used to make pens and rulers).

Manufacturers should pay to finance recycling programs.

TOPIC 5 SOFTWARE

1. **Software basics**

**Software** - is a set of instructions, data or programs used to operate computers and execute specific tasks.

Software consist of two basic types:

**System software** – controls the basic functions of a computer, e.g. operating systems, programming software and utility programs.

**Application software** - lets you do specific jobs such as writing letters, doing calculations, drawing or playing games.

**Programming software -** is the type of software Programming which used by software programmers as translator programs. They are facilitator software used to translate programming languages (i.e., Java, C++, Python, PHP, BASIC, etc) into machine language code.

**Utility software** – is a type of system software, which designed to help you monitor and configure settings for your device, its operating system, or application software. Like all system software, utilities focus on computer-centric tasks such as blocking viruses or diagnosing hard disk errors.

**Device driver** - is software that helps a peripheral device establish communication with a computer. This type of system software is used by printers, monitors, sound cards, network cards, storage devices, modems, mice, and scanners.

**Operating system** – is a set of programs that control the hardware and allow people and applications to communicate with the hardware. Typical functions of the OS are handling input/output operations, running programs and organizing files on disks. The OS also gives access to networks and allows multitasking - user can run several programs at a time.

1. **Buying and installing software**

**Software installation -** is the process of placing a program into a computer so that it can be run or executed. You can use some software without installing it, but other software has to be installed before you can use it.

**Open source software** - It’s software that everyone can use for free. Anyone can modify it, personalize it and distribute it without restrictions.

**Pros**:

1. Free to try, use, modify, redistribute
2. Free community forums that offer support
3. Better overall security
4. No vendor lock-in
5. Simple license management
6. Easily scaled and extended

**Cons:**

1. No competitive advantage
2. Community support not suited for enterprise scenarios
3. Limited liability and warranty protections

**Proprietary software** - kind of software is protected by copyright and a more of “legalese.” Anyone who wants to use proprietary software will have to purchase a license. Unlike open source, proprietary software can be modified only by the company that developed it and you get no access to its source cod.

**Pros:**

1. High product stability
2. Specialized technical support, especially for enterprise clients
3. Complete ownership and use of the software after paying the license fee
4. Ongoing dedicated support, updates, software development, and bug fixes

**Cons:**

1. Vendor lock-in
2. Limited flexibility and extensibility
3. Customizations may come at an extra cost
4. Reliance on the vendor to continue to debug and improve the product
5. Often complex EULA and TOS

**Copyright** - is a form of legal protection that grants the author of an original work an exclusive right to copy, distribute, sell, and modify that work. To copyright protection, computer software is often protected by the terms of a software license.

**Software license,** or **license agreement** - is a legal contract that defines the ways in which you may use a computer program.

**Basic computer troubleshooting** involves diagnosing, identifying and solving computer systems problems. Like any electronics equipment, a computer may stop working or unable to start at all because of several reasons. The reasons could be either software or hardware failure or both.

The good thing is that every PC problem has a solution. You can solve it if

you follow computer troubleshooting techniques.

1. **Software piracy**

**Software piracy** - is a term used to describe the act of illegally using, copying or distributing software without ownership or legal rights. The majority of software today is purchased as a single-user license, meaning that only one computer may have that software installed on it at one time. Copying that software to multiple computers or sharing it with your friend without multiple licenses is considered software piracy, which is illegal.

Other forms of software theft include physically stealing the software disc, a programmer stealing the software code, and using keygens to unlock software you didn't purchase.

**TOPIC 6 COMPUTER NETWORKS**

**1) Networking Basics** (definition of a network and its main characteristics, classification of networks based on size and scope: PAN, LAN, MAN, WAN; communication channels and their main types; network topology; network architecture: client-to-server and peer-to-peer; network protocols).

**Network** - is a group of two or more computers or other electronic devices that are interconnected for the purpose of exchanging data and sharing resources.

There are different network types that depend on how large they are and how much of an area they cover geographically, for example:

**PAN (personal area network)**. It is the type of network that is used on a personal level.

**LAN (local area network**). A local area network is a group of devices such as computers, servers, printers which are located in the same building.

**MAN** **(metropolitan area network)**. A network that spans over several buildings in a city or town and is connected using a high-speed connection such as fiber optic cable.

**WAN (wide area network)**. It is a network that spans over a large geographical area such as a country continent or even the entire globe.

**A communication channel** – it is the channel used to transport information from one network device to another. There are wired and wireless communication channels.

**Wired channels**

Wired networks are more difficult to install, but they are cheaper, faster and more reliable.

An example of a wired network technology is **Ethernet**.

**Wireless channels**

Wireless networks let you move, from one access point to another, but they are less secure and subject to interference.

These are the main types of wireless networks:

**Satellites** - for long distances;

**Wi-Fi** - for medium-range distances;

**Bluetooth** - for short distances;

**Client-server network** – it is computer network that use a special computer to store data, manage/provide resources and control user access.

The server acts as a central point on the network to which other computers connect. A computer that connects to the server is called a client.

**Peer-to-peer network** – it is a network in which there are no special servers.

Each of the computers is both a client and a server.

By **topology**:

Ring topology – computers connected in closed loop/

**Bus topology** – it is a type of network topology in which all the computers are connected to a main cable, or bus.

**Star topology** – it is a network topology in which all the computers are connected to a central node such as a router, hub or switch.

**Network protocols** – it is a set of rules for efficient data transfer from one network node to another.

For example:

**IRC (Internet Relay Chat)** - It transmits text messages in real time between online users.

**Transmission Control Protocol (TCP)** - It is designed to control the transmission of Internet data.

Concerning cloud computing is made possible by a technology called virtualization. Virtualization allows you to create a "virtual" computer or virtual machine which behaves as if it were a physical computer. By running multiple virtual machines simultaneously, multiple virtual "servers" can run on a single server. Even if individual servers go down, cloud servers as a whole should always be available. The purpose of the cloud computing is to keep information save not overloading a personal computer.

**2) Web Basics. Internet Technology** (definition of the Internet; types of the Internet connection (pros and cons); definition of the World Wide Web; components and technologies of the Web; process of accessing a website).

**Internet** an international computer network that allows people to share information around the world. There are different types of Internet connections that connect your computer to your Internet Service Provider (ISP), for examples:

**DSL (Digital Subscriber Line) -** is a high-speed digital permanent Internet access technology that runs over standard telephone lines and is one of the fastest in the world.

**Cable Internet access -** is a method of distributing continuous broadband Internet access just like cable TV. The data transfer rate depends on the number of users.

**Dial-Up connection** is the slowest type

**Fiber internet connection** the fastest type, its speed exceeds even DSL.

**Cellular connection** (4G, LTE, 5G)

**World Wide Web** (the Web) – it is a huge part of the Internet, which consists of the linked documents, called pages.

There are some components and technologies of the Web, for example:

**A browser** is a software that helps you look for information on the Internet.

**A website** is a document on the Web giving information about a particular subject, person or institution.

**The way to obtain access to a web-site is as follows:**

1. A user enters the URL of the Web page in the address bar of Web browser.

2. The browser requests the Domain Name Server for the IP address.

3. Browser sends the request for Web page to the Web server using HTTP.

4. The Web server receives request using HTTP protocol and checks its search for the requested Web page. If found, it returns it back to the Web browser.

5. The Web browser receives the Web page, it interprets it and displays the contents of Web page in Web browser's window.

**3) Internet of Things** (definition and scale of the IoT; applications of the IoT today; benefits that IoT brings; problems related to the IoT and their solutions; future of the IoT).

**The Internet of Things (IoT)** – it is the billions of physical devices that can communicate with the network independently of human action.

**The applications of the IoT include today**:

different medicine, transportation, energy production, smart home apps and others.

Some benefits that IoT brings:

* helps to save time;
* makes our life comfortable and easy;
* helps to track the state of health.

**IOT has a number of problems.**

The first of these is a **lack of understanding of the technology in order to unlock the full potential of the IoT**. To solve this problem, I propose free consultations. Another problem is that **government regulation cannot keep up with technology.** Businesses are often left without the important information they need to make decisions. In my opinion, the most important problem is **the security of your data**. But there is already an IoT Security Foundation, which will be responsible for checking connected devices for vulnerabilities.

Future of the IoT:

More and more cities will become "smart". It's not just consumers who will use IoT devices. Cities and businesses will increasingly use smart technology to save time and money.

With 5G, there will be more speed and the ability to connect more smart devices at the same time.

Cars will get much smarter.

**TOPIC 7. INFORMATION SYSTEMS**

**1) Information System Basics. SDLC: Planning and Analysis Phases** (definition of an information system, its goals, and examples of applications; types of information systems and their main characteristics; SDLC and its core phases; planning phase, its goal, and main activities; analysis phase, its goal, and main activities).

**Information system** – is an automated system designed to store, transmit and process information.

The goals of an information system are formed from the goals and objectives of the organization that uses it. But we can define main goas of information systems which are commonly used:

Improved decision making, competitive advantages, operational efficiency, customer service, improved innovation.

Applications of information systems used in many fields: education, business, medicine, navigation.

There are two main types of information systems: **Operation support systems** and **management support systems.**

About types of **operation support systems**:

**Transaction Processing Systems (TPS)**: these systems are used to capture, process, and store data generated by day-to-day business transactions, such as sales, orders, and payments.

**Process control systems (PCS)**: these systems use sensors, controllers, and actuators to regulate the process in real-time and maintain the desired operating conditions.

**Enterprise collaboration systems (ECS)**: these systems can include tools for email, instant messaging, file sharing, project management, and social networking, among others.

Types of **Management support systems**:

**Management information systems (MIS)**: These systems provide managers with information to support decision-making.

**Decision support systems (DSS**): These systems help managers make decisions by analyzing data and providing insights.

**Executive information systems (EIS):** software applications that provide top-level executives with quick access to key business information and data that is necessary for decision-making.

**main characteristics** of information systems:

Automation, data accuracy, integration, timeliness, accessibility, security, flexibility, scalability.

**SDLS** stands for System Development Life Cycle , that is a compilation of all the stages of creating and supporting the information system. There are five phases of SDLS: Planning, Analysis, Design, Implementation and Maintenance.

The first phase is Planning phase, it includes strategic scheduling and short-range operational scheduling. The second is Analysis phase, that deals with studying business requirements and project goals. The third phase is a Design phase, on which one or more designs are created to achieve the project result and satisfy the identified requirements in the previous phases. The next is an Implementation phase, its main goal is to make sure that the information system is completely documented so that it can be used effectively and modified easily. The last phase of the SDLS is Maintenance phase, its purpose is to provide the user with a reliable and available product.

Planning phase is the first phase of SDLS. This stage includes a lot of activities, such as choosing the development methodology, developing a project schedule, assembling a project team, justifying the project.

Its main **goal** is to create a project development plan.

The next phase is an Analysis. On this phase, project team studies the current system, determines system requirements, writes a requirement report. The goal of this stage is to produce a list of requirements for a new or revised information system.

**2) SDLC: Design and Implementation Phases** (definition of the design phase: its purpose and activities; hardware and software alternatives; selection tools of the design phase; definition of the implementation phase: its purpose and activities; types of testing; types of conversion).

Design phase – the third phase of SDLC.

Its main **activities** are identifying potential solutions, evaluating them and selecting the best, developing application specifications, obtaining approval to implement the new system. Design phase is about designing, prototyping and making. Its **purpose** of Design Phase is to understand how the new system will fulfil the requirements specified in the system requirements report.

A lot of **hardware** options are available for information systems, project team has to consider the architecture based on device requirements, network technology, cloud hosting and level of automation. Term **“device requirements”** refers to considering about all questions about customer’s hardware related to the developed system.

**Network technology** is about the choosing the network types for the system. Also project team can consider about the **cloud hosin**g – installing the system in the cloud instead of using costly in-house equipment. Another important option is a **level of automation**. The project team should consider on how different levels of system automation will affect all aspects of the system.

Also there are 4 different **software solutions**. They can be explained through the cake analogy. Using **application development tools** is like a baking cake by yourself: it takes a lot of time, but gives you more flexibility. Making system from scratch is like having a “cake mix “ that contains many ingredients for fast and easy baking. Using application software is equivalent to buying a pre-made cake. Buying a Turnkey system is like going out to dinner.

The next phase is an **Implementation phase**. The main **activities** of this stage are installing hardware and software, creating and testing applications, finishing documentations, testing development tools, etc.

Its **goal** is to make sure that the information system is completely documented so that it can be used effectively and modified easily.

**Testing** is an essential part of the Implementation.

There are **4** types of testing: **System Testing** (testing the whole system), **Acceptance testing** (testing the acceptance of new modules that can be added to system), **Unit testing** (ensures that all the modules will work together correctly), **Integration testing** (ensures that each module works correctly) and **Business Level testing** (is done by business analysts).

**Converting data** to a new system(conversion) is an important process.

There are **4** options of **conversion**: **Direct** - in which project team spilt process on the modules and work with the second only after they ensured that first is working correctly. **Parallel** - that mean that project team works with an old and new system simultaneously. **Phased** - when the new system activated immediately when old system deactivated. **Pilot** - in which old system is still activated when the new system partly or fully activated.

**3) SDLC: Maintenance Phase. System Security** (goal and key activities of the maintenance phase; considerations that should be taken during the maintenance phase; types of modification during the maintenance phase; quality of service and the metrics being used to measure it; potential threats to information systems; measures to protect data and information systems; pros and cons of online voting).

The last phase of SDLS is **Maintenance phase**.

There are such **activities** as making modifications and upgrades, fixing bugs and making the system easier to use.

The **goal** of Maintenance phase is to keep product working and upgrade it. The **main considerations** that should be taking during this phase can be distribute in 3 categories: **efficiency**, **usability**, **appropriateness**. The first is about the **speed** and **quality** of work of the system. **Usability** can be described with the question “How easy can we use it?”. **Appropriateness** is about the meeting of requirements.

One of the essential parts of Maintenance stage is **modification**, and there are 4 types of them:

**Major modifications** - that is about significant functional changes to the existing system.

**Routine modifications** - which correct problems or enhance security.

**Emergency modifications** as an answer for a crucial problem, that must be made quickly.

**Software patches** - program modifications involving externally developed software.

The level of performance of any information system defines as **quality of service**. It can be measured with the help of metrics, such as **throughput** - the amount of data processed in a particular time interval.

**accuracy** – the amount of errors occurring in a time interval for a function, **downtime** – the amount of time system isn’t available for processing, **capacity** – available storage space, **number of users**, etc., **user levels** – number of users on at different times, and **response time** – time period between user’s request and its fulfilling.

There are a lot of things that can **ruin the information system**. The main threats for it are **natural disasters**, **power outages**, **equipment failures**, **human errors**, **software failures**, **security breaches**, **acts of war and malware**. But the project team always consider about the ways they can prevent or fix the problems with their information system. Usually they use passwords, firewalls, encryption, disaster recovery plans, antiviruses, biometric security, file updates, data backups and hardware inventories.

**What Are The Advantages Of Online Voting Systems?:** The advantages of online voting systems include increased efficiency, improved accuracy, and greater voter engagement compared to paper ballots.

**What Are The Disadvantages Of Online Voting Systems?:** The two major concerns about online voting systems are election security and transparency.

TOPIC 8. COMPUTER PROGRAMMING:

**1) Programming Basics. Object-Oriented Programming** (computer programming and the activities it involves; programming paradigms; the types of programming languages; object-oriented programming; the most popular programming languages today).

**Computer programming** is the process of designing and building a computer program to achieve a specific task.

activities involved in programming:

1) **Analyzing the problem** - Provides basis for planning about the programming and to control the potential difficulties.

2) **Algorithm design** - listing all the instructions that must be executed.

3) **Making flowchart** - Creating of graphical tool that shows steps which are to be executed in a program.

4) **Coding -** Programmer writes the instructions in a computer language to solve the problem. Choice of language depends on requirements and facilities available with a language.

5) **Debugging** - programmer removes all errors in the program This is done several times until all the errors are removed from the program

6) **Testing** - the program is tested by entering dummy data to check the behavior and result of the program toward the given data.

7) **Getting final output** - after going through all the above stages, the program is given the true data here programmer expects positive result of the program.

Popular programming paradigms:

- Imperative programming

- Procedural programming

- Functional programming

- Declarative programming

- Object-oriented programming

**Imperative Programming** - consists of sets of detailed instructions that are given to the computer to execute in a given order. It's called "imperative".

**Procedural Programming** - user is encouraged to subdivide the program execution into functions, as a way of improving modularity and organization.

**Functional programming** - takes the concept of functions a little bit further.

**Declarative programming** is all about hiding away complexity and bringing programming languages closer to human language and thinking.

The core concept of **Object-oriented programming** - is to separate concerns into entities which are coded as objects. Each entity will group a given set of information and actions that can be performed by the entity.

**Types of Programming Languages:**

**Procedural Programming Language**

A procedural programming language is a type of programming language that uses a step-by-step approach to solving a problem. This type of programming language uses numerous variables, complex loops and other elements.

Some popular procedural programming languages include C and Pascal.

**Functional Programming Language**

This is a type of programming language that focuses on the use of functions. The main goal of functional programming is to solve a problem by defining and composing functions. The functions take one or more inputs, perform some computation, and return the output.

**Scripting Programming Language**

A scripting language is a programming language used to create scripts that can be executed in real time. The main purposes of a scripting language are to automate repetitive tasks, simplify complex processes, and enable rapid prototyping of programs.

Scripting languages are often used for system administration tasks, web development, and data analysis because they are designed to be easy and flexible.

**Logic Programming Language**

Logic Programming Language is a programming language that operates based on rules and relationships between objects. The main goal of Logic Programming Language is to represent complex systems.

**Object-oriented programming** (OOP) is a type of programming language that is based on the object-oriented programming paradigm. This means that the code is written in a way that focuses on objects, which represent real-world entities and the interactions between them.

The **main goal** of object-oriented programming is to create code that is modular, extensible, and reusable. To achieve this goal, OOP introduces four **fundamental concepts**:

1. **Encapsulation**: This allows us to hide the internal complexity of the class and expose only the necessary functionalities to the outside world.

2. **Inheritance**: This allows us to create new classes that inherit the properties and functionality of existing classes. This makes possible to reuse code.

3. **Polymorphism**: This enables us to use the same interface (method or function) with different types of objects. This makes code more flexible.

4. **Abstraction**: This allows programmers to focus on the essential features of an object while hiding its implementation details. This makes code easier to maintain and update over time.

**The most popular programming languages today:**

1. JavaScript - used mainly for front-end web development, but also growing in popularity for server-side web development and mobile app development.

2. Python - used for a wide range of applications including data analysis, artificial intelligence, web development, and automation.

3. Java - a popular language used for enterprise-level applications, Android app development, and web development.

4. C++ - an efficient and powerful language used mainly for systems programming, game development, and embedded systems.

5. C# - often used in mobile and enterprise software applications, is fast and open source.

**2) Artificial Intelligence. Game Programming** (artificial intelligence, its use,advantages and disadvantages; artificial intelligence, machine learning, and deep learning; the difference between virtual and augmented realities; game programming; components and types of video games).

**Artificial intelligence** - is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

**Advantages**:

**Prevents human error and risk**

Using AI to complete tasks can prevent human error from creating perfectly useful products or services.

**24/7 availability**

Machines can work all through the day and night, and AI-powered chatbots can provide customer service even during off-hours.

**Unbiased decision making**

AI algorithm has been trained using unbiased datasets and tested for programming bias, the program will be able to make decisions without the influence of bias.

**Repetitive jobs**

Using an AI program can save humans from the boredom of repetitive tasks, and save their energy for work that requires more creative energy.

**Cost reduction**

AI can help to take over manual and tedious tasks, it frees up workers for higher-skilled tasks.

**Data analysis**

AI algorithms can help process higher volumes of complex data, making it usable for analysis.

**Disadvantages**:

**Costly implementation**

The cost for a fully implemented AI solution for most businesses can reach millions.

**Lack of emotion and creativity**

AI can’t create new solutions to problems in any artistic field.

**No improvement with experience**

AI can’t naturally learn from its own experience and mistakes.

**Reduced jobs for humans**

In future AI becomes more commonplace at companies, it may decrease available jobs, since AI can easily handle repetitive tasks that were previously done by workers.

**The difference between virtual and augmented realities.**

**Virtual reality** (VR) is a computer-generated simulation of an alternate world or reality, and is primarily used in 3D movies and in video games. Virtual reality creates simulations meant to shut out the real world and envelope or “immerse” the viewer using computers and sensory equipment such as headsets and gloves. Apart from games and entertainment, virtual reality has also long been used in training, education, and science.

**Augmented reality** (AR) is VR’s cousin and makes no pretense of creating a virtual world. Unlike VR, AR is accessed using much more common equipment such as mobile phones, and it places characters and letters on top of video or a camera viewer, which most consumers already have, making it much more usable for retail, games, and movies.

**Machine learning** - An application of artificial intelligence that includes algorithms that parse data, learn from that data, and then apply what they’ve learned to make informed decisions.

**Deep learning** - a subfield of machine learning that structures algorithms in layers to create an “artificial neural network” that can learn and make intelligent decisions on its own.

**The difference between machine learning and deep learning**

In practical terms, **deep learning is just a subset of machine learning**. In fact, deep learning is machine learning and works functions in a similar way.

While basic machine learning models do become progressively better at performing their specific functions as they take in new data, they still need some human intervention. A deep learning model is able to learn through its own method of computing—a technique that makes it seem like it has its own brain.

**Game programming** is the software development of video games in a given language, as well as specialization in one or more of the following areas: simulation, computer graphics, artificial intelligence, physics, audio programming and input.

There are many **components for making video games**. Once all the different components are put together, you get the desired video game of your choice. The most interesting are:

1) **Game world**

It’s the virtual world which enables the gamers to feel like they are in a living and breathing world while playing the game.

2) **Video game characters**

The game can have characters from your imagination, whose actions and behavior you create.

3) **Music**

One of the most important component of a video game is the music. A good music or sound effect can change the feeling of a video game and influence the mood of gamers.

4) **Visuals**

A game with sharp graphics will attract a lot of gamers to play the game. It enhances the gaming experience.

**3) Robotics** (robotic system: building blocks, tasks and capabilities; robots:

consistent characteristics; robotics programming languages and approaches; robotic systems: types, applications, benefits, challenges and threats).

**Robotic system -** is the system that provides intelligent services and information by interacting with their environment, including human beings, by using of various sensors, actuators and human interfaces.

**Building blocks**

1) **Power Supply** - The working power to the robot is provided by batteries, hydraulic, solar power, or pneumatic power sources.

2) **Actuators** - Actuators are the energy conversion device used inside a robot. The major function of actuators is to convert energy into movement.

3) **Electric motors** - Motors are electromech(х)anical compónent used for converting electrical energy into its equivalent mechanical energy. In robots motors are used for providing rotational movement.

4) **Sensors** - Sensors provide real time information on the task environment. Robots are equipped with tactile sensor it imitates the mechanical properties of touch receptors of human fingerprints and a vision sensor is used for computing the depth in the environment.

5) **Controller** - Controller is a part of robot that coordinates all motion of the mechanical system. The heart of robot's controller is a microprocessor linked with the input/output and monitoring device.

**Tasks and capabilities**

**1. Stacking**

A simple pick and place task is to program your robot to stack parts that come off a production line or from a previous operation.

**2. Sorting**

A great pick and place task is to sort different objects into separate piles or onto separate conveyors

**3. Packaging(**|ˈpækɪdʒɪŋ|)

Packaging consists of picking objects from one part of the workspace and placing them into a box, tray, bag, or another packaging container.

**4. Quality Control**

Pick and place is often used in quality control tasks immediately following an inspection step.

**5. Machine Tending**

This involves picking objects from a pile, bin, or conveyor and placing them into a machine. When the machine’s operation is finished, the robot removes the finished parts.

**6. Assembly**

Assembly is a completely different type of robotic task, involving actions such as insertions, alignment, and screwing. You need to move objects next to each other and another robot or machine finishes the assembly action.

**Robots: consistent characteristics**

1. Robots consist of some sort of **mechanical construction**. The mechanical aspect of a robot helps it complete tasks in the environment for which it’s designed.
2. Robots need **electrical compónents** that control and power the machinery .An electric current — a battery, for example — is needed to power a large majority of robots.
3. Robots contain at least some level of **computer programming**. Inserting a program into a robot gives it the ability to know when and how to carry out a task.

**Robotics programming languages and approaches**

Programming languages are the foundation for controlling and manipulating robotic hardware. Understanding the various programming languages available for robotics is essential to make the most out of your robot. Many different programming languages can be used for robotics, but some are more popular than others. In the modern chart, the **most popular languages in robotics** are **C++**, **Python**, and **Java**.

Approaches robotics programming languages:

**C++**

Control of looping;

developing a robot physics and motion algorithm

Interconnection of low-level hardware

**Python**

Developing of prototypes

Making post-process robot programs

Flexible sensors and actuators programming

**Java**

Developing of robot database

Programming artificial intelligence and neural algorithms

Мachine learning modification algorithms.

By purpose, robots are divided into **7 types**: **medical**, **military, domestic, service, industrial, entertainment and educational**.

Robotics also has 5 **challenges** for humans:

Regular service;

Machinery must be kept in working order;

Maintenance and repair of some machines can be quite expensive;

High-precision robotics needs regular updates, which increases the cost of its maintenance;

Power consumption.

**Threats** associated with robots:

The danger of losing a job due to the replacement of specialists in their profession by robots According to a number of forecasts, many of us will lose our jobs in the coming years due to automation and the introduction of AI.

The destruction of humanity by machines due to the emergence of hostile AI

Risk of unauthorized access to your personal information

Danger of interception of robot control (hacking)

The danger of mass distribution of autonomous combat robots with deadly weapons

Combining combat drones into groups of hundreds and thousands of units

Thus, robotics is certainly an important component of the development of mankind, but you need to understand that there is nothing in the world that would only bring benefits.

**TOPIC 9. DIGITAL SECURITY**

1) **Security Basics. Password and Hardware Security** (security basics: security in IT, physical security, information security, application security; password security authentication, password, attacks, protection; hardware security and maintenance: anti-theft, power surge, cleaning, troubleshooting; safety on the Internet).

**Security in information technology** (IT) - is the protection of digital information and IT against internal and external, malicious and accidental threats.

This protection includes detection, prevention and reaction to threats through the use of security policies, software tools and IT services.

**Physical security -** is the protection of your people, property and assets. This includes physical protection of equipment and technologies, including data warehouses, servers and employee computers.

**Information Security** can be defined as the protection of data transmitted between users on the internet from everything that may harm it, change it or expose it to viewing by unqualified persons for this.

**Application security** - is the use of tools and processes to secure applications across their life cycle.

**Password security** is a protection of user information, which use user authentication.

**Password attacks** is a big serious problem nowadays.

When someone gains unauthorised access to your personal data and uses it illegally, it is called identity theft.

If a hacker doesn't have physical access to your work area, but your computer is connected to a network, your password can be discovered by hacker using a remote commuter and sottware tools that systematically guess your password, intercept it.

The **brute force attack** uses passwords cracking software which choose all possible combinations of letters to decrypt a password, a brute force attack can run for days to crack some passwords.

Sniffing is a process of interception information sent out over computer networks.

**Sniffing** software is used legitimately by network administrators to record network traffic for monitoring and maintenance purposes. The same software can also be used for illicit activities.

**Phishing** is when a hacker poses as a legitimate representative of an official organization such as ISO in order to persuade you to disclose highly confidential information.

**A key logger** is software that secretly records a user’s keystrokes and sends the information to a hacker.

**Trojan** is a computer program that seem to perform one function while actually doing something else.

**Hardware security** **and maintenance**:

To ensure that vour computer stays in good running condition, it is essential to protect its hardware from power surges.

A **power surge** is a sudden increase in electrical energy affecting the current that flows to electrical outlets.

You can protect your computer equipment from power surges by plugging it into a surge suppressor, instead of directly into a wall outlet.

To protect computer during the **thunderstorms,** shut down your computer, turn off all your peripheral devices, and unplug the surge **suppressor** and all computer-related cables from wall outlets, including the cable for your modem.

**Basic maintenance to prevent hardware problems:**

* Back up your files regularly, particularly those that are most important to you.
* Test your back up procedures periodically.
* Run utilities that ensure peak performance for your hard disk drive.
* Delete your browser’s history and cache files on a monthly basis in order to free up space for your temporary files.
* Apply the latest operating system, driver, and security updates.
* Scan your computer for viruses and spyware once a week.
* Keep antivirus and spyware definitions updated.

2) Malware. Software Security (malware: definition and its types; ways to be infected; ways to avoid computer infection; antivirus software (techniques); cyberwarfare attacks and cyber weapon).

The term **malware** refer to any computer program designed to enter secretly a computer, gain unauthorized access to data, or disrupt normal processing operations.

**Malware (types) includes**: **viruses**, **worms, Trojans, bots, and spyware**. Malware is created by hackers, crackers, black hats, or cybercriminals.

**Ways to be infected**:

* Running a program infected with a virus on a computer.
* Connecting an infected driver to the system.
* Opening a document infected with a virus.
* Installing an infected operating system on a computer. And others.

**Ways to avoid computer infection:**

* Install and activate security software on an digital device that is at risk.
* Keep software and operating system up to date.
* Do not open suspicious email attachments.
* Use software only from reliable sources; and before running it, use security software to scan for malware.
* Avoid unsavory Websites.
* Use antivirus software.

**Antivirus software (techniques)**

The best way to avoid computer infection against malware is **antivirus software.**

**Antivirus software** - is a type of utility software that looks for and liquidate viruses like trojans, worms, and other malware.

Popular antivirus software includes **Kaspersky Anti-Virus, Windows Defender, and Avast.**

Antivirus software techniques include:

**Heuristic analyses** - techniques that detect malware by analysing the characteristics and behaviour of suspicious files.

**Сyberwarfare attacks and cyber weapon**

**Cyberwarfare** - is a situation like a war where state or nation is impacted, damages human life and it has long term effects.

**Cyber weapons** are hospitals, water supplies, fully-automated transportation control systems, air traffic controls, electricity grid management, systems communication and data networks.

3) **Social Engineering. Encryption** (social engineering and why it is so widespread today; methods of social engineering; protection techniques against phishing, vishing,smishing; encryption, its types, where it is used, why it matters; protection against ransomware).

**Social engineering** is a false practice that use human psychology. Its **goal** is to involve victims to interact with a digital device and get financial gain or cause service problems.

**Methods of social engineering** include: Shouldering (shoulder surfing); ﻿﻿﻿Pharming; ﻿﻿﻿Phishing; ﻿﻿﻿Baiting; ﻿﻿﻿Spear Phishing;﻿﻿﻿ Vishing; ﻿﻿﻿Tailgating; Rogue Antivirus.

**Protection techniques against phishing, vishing, smishing**

a)Be cautious about all communications you receive.

b)Don’t pick up the phone, simply let it go to voicemail.

c)Don’t press buttons or respond to prompts.

d)Don’t enter personal information in a pop-up screen.

e)Do not click on any links listed in the email message, and do not open any attachments contained in a suspicious email.

f)Install a special spam filter on your email application and your web browser.

g) The moment you suspect it’s a fraudulent phone call, don’t feel obliged to carry on a polite conversation. Simply hang up and block the number.

h) Verify the caller’s identity. If the person provides a call-back number, it may be part of the scam, so don’t use it.

**Encryption** helps protect your online privacy by turning personal information into "for your eyes only" messages intended only for the parties that need them. Encryption is essential to help protect your sensitive personal information. But in the case of ransomware attacks, it can be used against you.

**Protection against ransomware**

**Ransomware** is software that can lock your computer and then demand a ransom for its release.

* Install and use trusted security software on all your devices, including your mobile phone. Keep your security software up to date.
* Be wary of any email attachment that advises you to enable macros to view its content. If you enable macros, macro malware can infect multiple files.
* Back up your data to an external hard drive. If you're the victim of a ransomware attack, you'll likely be able to restore your files.
* Don't pay the ransom. You could pay a ransom in hopes of getting your files back, but you might not get them back.

TOPIC 10 JOB HUNTING

**1) Looking for a Job**

**the stages in the job application process:**

researching the market, writing a resume, researching yourself, writing a cover letter, reading a job advertisement, attending an interview, sending a follow-up letter.

**- ways to research the market for job openings;**

Linkedin, social media platforms, professional sites.

- my strengths and weaknesses, likes, dislikes, preferences, and interests in terms

of professional behaviour;

- my profile: education, qualifications, transferable skills, experience;

- **the strategy of a successful job-hunting process.**

1. Identify your career goals and target industries

2. Research companies that align with your career goals and values

3. Network with professionals in your desired industry through informational interviews and industry events

4. Develop a clear elevator pitch to quickly communicate your experience and goals to potential employers

5. Practice interviewing skills with a friend or mentor

6. Customize your résumé and cover letter for each job application

7. Follow up with recruiters and hiring managers to express interest in the position and learn about next steps

8. Utilize job search resources such as career coaches, recruiters, and job fairs

9. Build a portfolio of work samples to showcase your skills and experience

10. Consider taking relevant courses or earning certifications to enhance your qualifications

11. Stay organized by keeping track of job applications, follow-up actions, and deadlines in a job search tracker or planner.

**2) Writing a CV/Resume. Cover Letter:**

**- résumé writing rules: goal, structure, main sections, tips**;

Resume goal it to shorly describe your education, qualifications, previous jobs and personal interests for employer when you are trying to get a job.

Structure: education, cantact information, certificates, publications, languages, hobbies, experience, honours, skills.

Main sections: Heading, education, experience, additional sections, resume language.

- **cover letter: purpose, main features, challenges**.

Cover letter is a document that accompanies your resume when applying for a job. It serves as an introduction to the employer, highlighting your qualifications, experiences, and interest in the position.

**Purposes**:

* Introduce yourself: A cover letter allows you to provide a personalized introduction to the hiring manager and establish a connection.
* Highlight relevant qualifications: It gives you an opportunity to expand on specific skills and experiences that are directly related to the job.
* Demonstrate enthusiasm and interest: A well-crafted cover letter showcases your enthusiasm for the position and the company, helping you stand out among other applicants.
* Showcase your writing skills: It serves as a writing sample, demonstrating your ability to communicate effectively and professionally.

**Features:**

* **Heading**: Include your contact information (name, address, phone number, email) at the top of the letter, followed by the date and the employer's contact details.
* **Salutation**: Address the letter to a specific person whenever possible. If you don't have a name, use a professional salutation such as "Dear Hiring Manager" or "Dear [Company Name] Recruiter."
* **Introduction**: Start with a strong opening paragraph that captures the reader's attention. State the position you are applying for and briefly mention how you learned about the opportunity.
* **Body paragraphs**: The main body of the cover letter provides an opportunity to showcase your qualifications and experiences. Highlight specific accomplishments, skills, and experiences that are relevant to the job. Use this section to demonstrate how your background aligns with the company's needs.
* **Closing paragraph**: Summarize your key qualifications and reiterate your interest in the position. Mention that you have attached your resume for their review and express your willingness to provide additional information or attend an interview.
* **Closing and signature:** Use a professional closing such as "Sincerely" or "Best regards" followed by your full name. Leave space for your handwritten signature if submitting a physical copy, or use a digital signature for electronic submissions.

**Challenges:**

* Length limitations: Cover letters are typically one page in length, so it can be challenging to effectively convey your qualifications and enthusiasm within the limited space.
* Customization: Tailoring your cover letter for each job application takes time and effort. It requires researching the company, understanding the job requirements, and aligning your experiences accordingly.
* Striking the right tone: It can be challenging to strike a balance between showcasing your achievements and skills without sounding overly boastful or generic.
* Capturing attention: With a large number of applicants, it's crucial to grab the reader's attention from the start. Crafting a compelling opening paragraph is essential.
* Avoiding repetition: Your cover letter should complement your resume, not duplicate it. Ensure that the information provided in the cover letter adds value and expands upon your resume rather than repeating it verbatim.

Part 3. Job Interview:

- pre-interview preparation tips;

* Practise the answers to common interview questions.
* Prepare a list of questions to ask at the interview
* Bring a copy of your resume and get ready to discuss it in detail.
* Practice greeting your resume and get ready to discuss it in detail.
* Do some research into the company you are applying to.

- interview types: main characteristics and challenges;

**Panel interview** – include a group of interviewers who interview one candidate at the same time, and then they will make the hiring decision.

**Traditional interview** – most popular type of interview. It includes the interviewer and interviewee with many questions asked and answered.

Competence-based interview – used by interviewers to assess your performance in a particular key area or skill that is attributable to the job description.

Phone interview – conducted when the recruiter wants to shortlist the number of candidates to the next step.

Stress interview – uses several questions to set a candidate off-balance.

- interview strategy: stages, common interview questions, dos and don’ts;

**Stages:**

1. Arrival and meeting.

2. The interviewer asks general questions about the candidate’s life.

3. The interviewer reviews the résumé.

4. The candidate is asked what he/she knows about the job and the company.

5. The candidate asks questions about the job and the company.

6. The interviewer places one or two tricky questions at the end of the interview.

7. The interviewer thanks the interviewee for the time spent.

**Common interview questions**:

1. What can you tell us about yourself ?

2. How do you work with “difficult” people?

3. What will my responsibilities be in this position?

4. Where do you see yourself in five years’ time?

5. What do you know about our company’s products?

6. What are you good at?

7. What is the weakness that you have?

8. What do you most enjoy about your time at university?

9. What skills do you have relevant to this job?

10. Did you have any trouble finding our building?

- work values an employer is looking for in a candidate:

Integrity, reliability, initiative, adaptability, teamwork, accountability, Continuous Learning, Flexibility.